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Mendes, Ana Carina Loureiro; Chronakis, Ioannis S.

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Highly functionalized nano-microstructures for Bioengineering

Ana C. Mendes[1]*, Ioannis S. Chronakis[1]

1: *Nano-BioScience Research Group, DTU-Food,Technical University of Denmark, Søltofts plads, B227, 2800 Kgs. Lyngby, Denmark.*

*[1]Corresponding author email: anac@food.dtu.dk

Biopolymers are of great interest for Bioengineering applications, and materials research, due to their environmentally friendly production, biocompatibility and biodegradability. However, the knowledge and manipulation about its structure/function relationships is fundamental to create effective solutions to fabricate nano-microstructures (NMS) with increased level of control over their structure, shape, bioactivity and overall performance. Therefore, this work intends to show different approaches to fabricate NMS by exploring the properties of the biopolymers in combination with fabrication techniques such as molecular self-assembly, micro-fluidics, soft lithography, electrospinning. Specific applications of these NMS include: MNS as scaffolds tissue engineering; NMS as hydrogels and fibers for drug delivery (and delivery of bioactives in general) and NMS as capsules for cell microencapsulation.